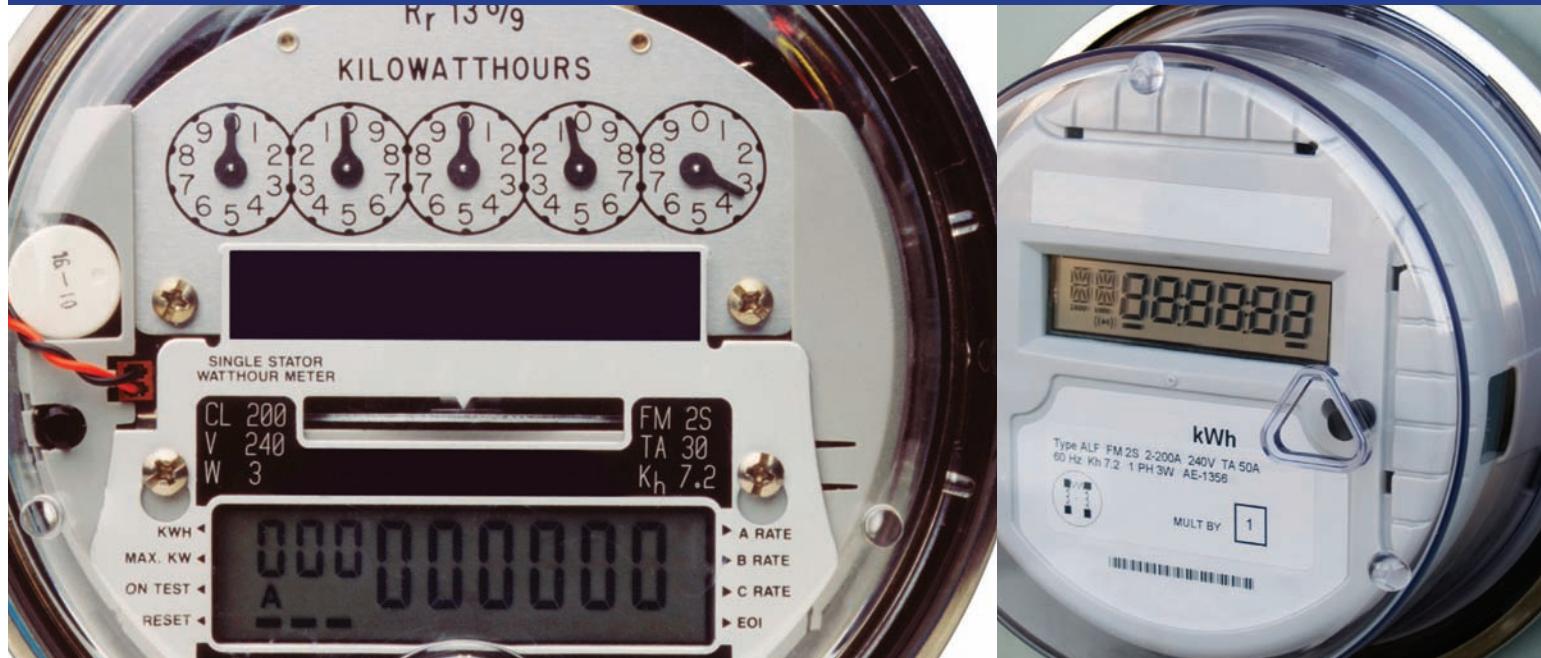




Advanced Meters: *How Customers Benefit*



October 2010





California Public Utilities Commission

Advanced Meters: How Customers Benefit

**POLICY AND PLANNING DIVISION
STAFF WHITE PAPER**

October 25, 2010



This paper is part of the California Public utilities Commission's Emerging Issues Forum Working Paper Series. The CPUC's Emerging Issues Forum provides an opportunity for CPUC staff and industry experts to share ideas on topics outside of the CPUC's formal regulatory or rulemaking process in the industries the Commission regulates: communications, energy, transportation, and water. Such topics can include emerging technologies, mid- and long-term policy issues among others.

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INTRODUCTION

In California and throughout the nation there is a concerted effort to modernize the electricity system. To a large extent, much of the energy infrastructure powering this nation was built in the World War II era, utilizing technology that has not significantly changed in the last 100 years. California, like the rest of the nation, must invest a significant amount of capital into its energy infrastructure in order to realize its ambitious energy and Greenhouse Gas reduction goals.

Electricity customers can see, experience, and benefit from this modernization; it is readily apparent in many ways, perhaps the most being the deployment of advanced meters, also known as Smart Meters. Utilities across the country are deploying these advanced digital devices that are designed to monitor energy consumption by the hour and day. According to the Edison Foundation, more than 8 million advanced meters have been deployed by electric utilities in the U.S. and nearly 60 million should be in place by 2020. In California, the California Public Utilities Commission (CPUC) authorized Southern California Edison (SCE) to install approximately 5.3 million new advanced meters, San Diego Gas and Electric Company (SDG&E) 1.4 million electric advanced meters and 900,000 natural gas meters, Pacific Gas and Electric Company (PG&E) approximately 5 million electric meters and 4.2 million natural gas meters, and Southern California Gas Company (SoCal Gas) has been authorized to retrofit 4 million gas meters with communications modules and replace 2 million gas meters with built in modules.

However, in California and other parts of the country, installation of advanced meters has not progressed smoothly. The deployments have left many consumers asking, “what makes a meter ‘smart’?” and “what’s in it for me?” Both of these questions are important, and utilities and regulators have not done an adequate job of explaining how these new devices will benefit consumers. One reason why consumer outreach efforts have been subpar is because the benefits to consumers are not all direct and easily quantifiable; some are indirect, and industry needs to be aware of this nuance when describing the rationale for installing advanced meters. This paper will explore a number of the benefits that advanced meters provide to customers in the near and long-term.¹

¹ This paper is intended to be the first in a series of papers that will examine the potential benefits that result from the deployment of advanced metering infrastructure. As programs and policies evolve new benefits will accrue to both consumers and service providers.

WHAT MAKES A METER ‘SMART’?

The traditional meter most residential customers have had on their residence was analog; the meter employed gears and dials, much like an older model car’s odometer, to measure how much energy is consumed over a given period, typically a month-long billing cycle. The usage information was gathered by a meter reader and then transferred into the utility’s billing system to calculate a customer’s bill. These analog meters have been in place for decades; they are highly reliable. However, traditional analog meters have limitations that make them incompatible with the energy and environmental goals of the 21st century and beyond. While a traditional meter can keep track of a customer’s cumulative energy consumption, the meter does not have the capacity to report that data back to the utility at a more granular basis (for example, daily or hourly). This lack of information leaves customers and utilities with a significant information gap.

Advanced meters are digital, much like a new car’s odometer; rather than gears and dials the new meters have a digital display (i.e., numbers). These new meters use technology that provides two-way communication between the meter itself, the customer, and the utility. This communication occurs using a secure wireless network technology. Advanced meters provide the opportunity to measure energy consumption in smaller increments – possibly in five minute intervals – and the data is available in (near) real-time.

Ultimately, the main difference between a traditional electric meter and an advanced meter is the granularity of usage data gathered and the frequency that the data is made available to the utility and to the customer. However, these two small changes yield a number of important benefits to customers.

WHAT DOES AN ADVANCED METER DO FOR CUSTOMERS?

An advanced meter provides more detailed information about electricity usage and costs, allowing customers to make a more informed decision about their usage. By providing customers with the information necessary to understand their energy use, they can make informed decisions on how to better manage energy consumption and potentially reduce energy bills. Today, customers have to wait for the end of their billing cycle to receive usage information; a customer with an advanced meter can track electricity use as frequently as they choose. A customer can use this information to help inform future electric consumption choices in order to manage bills more effectively. Having more accessible information and feedback on electricity usage will help inform a customer in finding the right balance between electric usage, enjoyment from that usage, and amount paid for that usage.

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Today, customers with an advanced meter can access their prior day's energy usage through their utility's website. Within the next several years, by installing an in-home display device a customer could monitor their electricity usage and costs in real-time (similar to the price and quantity displays on a gas pump), allowing them to adjust their usage instantaneously in response to changes in prices or signals from their utility by delaying the use of a high-energy appliance or shutting them off. This could be done manually or automatically by pre-programming the device or appliance. Customers will decide when and how to use their electricity before they get a bill that is beyond their monthly budget.

It is important to note that an advanced meter does not impact the rate that customers are charged for their energy usage. Having the advanced meter, by itself, does not impact the end bill. In California, most residential customers are charged for their usage with an increasing price plan, meaning the more electricity used, the greater the price is for that portion of usage. The advanced meter's communication capability can notify the customer each time their usage triggers a price increase. This notification can happen via a variety of methods, such as phone, email, text message, etc. Knowing the price being charged will enable the customer to make a more informed decision about electricity usage, thus impacting the monthly bill.

Alternatively, if a customer chooses to participate in dynamic rates offered by a utility, the customer has an opportunity to save money by lowering consumption during peak periods, when prices will be at their highest. "Dynamic pricing" refers to retail electric rates that reflect actual wholesale market conditions. The true cost of generating electricity does not increase throughout the month (as the traditional residential price structure suggests) but rather it varies throughout the day because the amount of electricity needed throughout the day is not uniform. One example of dynamic pricing is critical peak pricing which is a rate that includes a short term rate increase during critical conditions. Another example is real time pricing – a rate linked to actual hourly wholesale energy prices. Participating in such a program could result in potential bill savings because a reduction in usage is more valuable in the middle of the day (when electricity prices are relatively high) versus the middle of the night (when electricity prices are relatively low). Meaning, if customers wanted to manage their electricity bill, they could shift some discretionary usage from when the cost to generate electricity is high to a time when it is less expensive. This has the end result of saving the customer money.

With a dynamic rate and with more consumption information, customers can better manage or budget for their monthly electricity bill. However, it is entirely possible that there will be customers who will want to use the information from the advanced meter to save money on their bill, but simply do not have the time to dedicate to managing their energy bill. Using the data from the advanced meter combined with the prices from the dynamic rate, third parties can introduce new ways to customers to help save money. These third party services can vary from a cell phone application to an integrated communication device in an appliance. For example, a smart phone application could alert a customer to a price remotely and prompt them to make usage

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changes. The infrastructure provided by the advanced meter will allow these kinds of decisions to occur in a seamless and integrated fashion.

Another benefit that an advanced meters yields is that it provides better information about when and how electricity is consumed. This information can reduce the need to build a new power plant or avoid the use of an older, less efficient power plant. On a typical day in California, 30,000 to 35,000 megawatts of capacity are needed to meet demand. But that amount jumps to 50,000 megawatts on a hot day, which forces generators to turn on their least efficient, most expensive, and most polluting plants to meet the increased demand. If we can find a way to flatten this disparity (flatten peak demand) we can lower overall system costs and greatly reduce pollution. This is beneficial for all utility customers because the costs of building new power plants or relying on older, less-efficient power plants are eventually passed on to customers in their retail rates.

Additionally, the advanced meter's enhanced communication capabilities allow for faster outage detection. This will result in the utility being able to restore service faster and therefore, less disruption to a customer's home or business. Today, the utility's infrastructure does not give them the granular information needed to quickly detect problems during outages. By being informed of an outage via the meter (as opposed to waiting for a complaint call), the utility can increase the reliability and quality of service. The utility uses the communication capability of all of the meters in the surrounding area to help quickly isolate where the service outage is located.

CONCLUSION

Advanced meters are the first step toward creating an advanced electrical grid (commonly referred to as the “Smart Grid”) in California. Smart Grid applies digital technologies to the grid and enables real-time coordination of information from generation supply resources, demand resources, and distributed energy resources, like fuel cells, solar, combined heat and power, microturbines, and energy storage. Essentially, an advanced grid will apply digital technologies to every aspect of the industry, from generation, to transmission, to distribution, and importantly, to the customer interface. This will help the grid sense what is happening to the energy flow, keep it in balance, improve reliability, and make the grid more resilient in the face of outages and other problems. It also serves to make the customer a vital player in the operations of the grid, and utilities and regulators must adapt to this fact.

However, customers often ask “what's-in-it-for-me,” and electric utilities across the country have not successfully explained the benefits of the Smart Grid and advanced meters. Advanced meters are critical infrastructure to help customers to use their electricity more efficiently. With an advanced meter, customers

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and the utility will have access to information about energy use in an unprecedented manner. However, simply having access to this information is not enough. Customers and the utility must utilize this information to change certain behaviors.

This increased access to information will provide an opportunity to more efficiently manage energy use. Customers need to be able to receive this information, yes, but they also need to be able to perceive benefits from the information in order for the larger goals to be realized. In addition, advanced meters are a fundamental building block in the process of updating California's aging energy infrastructure. Rebuilding a large and complex system like California's electric generation, transmission, and distribution system is a vast undertaking; it cannot be accomplished overnight. Investments and improvements must be done in a logical, phased-in approach. Installation of advanced meters is one of the first steps to be taken, and it is appropriate for it to be the first step. As more steps are taken, more and more benefits will flow to consumers.

Ultimately, the additional information about *when* and *where* electricity gets used will allow state regulators to make a more informed decision in how to set prices and what types of resources should make up the supply of the state's electric infrastructure. Best matching consumption of electricity and electricity production will reduce the number of stranded resources and minimize electricity costs. This transition will lead to more reliable, cost-effective, and environmentally responsible infrastructure.